DETAILED ACTION

1. The following action is a response to the Amendment of 4/7/2008 and subsequent telephone interview of 4/9/2008. Claims 1-16 have been amended by Examiner's Amendment. Claims 17-32 have been canceled. Claims 1-16 remain pending and are allowed.

2. This action includes an Examiner's Amendment and Reasons for Allowance.

Examiner's Amendment

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Attorney Naya Chatterjee-Marathe (Reg#54,680) on 4/9/2008 and 4/10/2008.

In the claims:

Cancel claims 17-32.

Please amend claims 1-16 from the response and amendment of 4/7/2008 as follows:

1. (Currently Amended) A computer-implemented method for estimating the hidden demand for a perishable consumer item at an outlet at an occurrence of a sellout ~~F~~for use with a demand forecast ~~application capable of traversing a demand forecast~~ tree having at least one node with a time series of actual sales values associated therewith representing the actual sales of the~~a~~ perishable consumer item at the~~an~~ outlet over an observation period, the observation period containing at least one occurrence of a sellout~~, a computer implemented method for estimating the hidden demand for the perishable consumer item at the outlet at an occurrence of a sellout~~, the method comprising ~~the steps of~~:

determining a subset of sales values of the time series of actual sales values over the observation period for the perishable consumer item at the outlet, the subset of sales values excluding the actual sales value(s) at the at least one ~~the~~ occurrence of ~~the~~a sellout, the occurrence of the sellout being determined by comparing a sales value of the time series of sales values against a corresponding draw quantity of a time series of draw quantities;

applying a statistical seasonal causal time series forecasting model of count data on the subset of sales values to determine a forecasted mean demand value for the perishable consumer item at the outlet at the occurrence of the sellout; and

estimating the hidden demand at the occurrence of the sellout using a single parameter probability distribution conditioned on the forecasted mean demand value;

wherein the forecasted mean demand value is calculated from the subset of actual sales values excluding the actual sales value(s) at the at least one occurrence of the sellout; and

wherein the single parameter probability distribution is conditioned on the forecasted mean demand value; and

whereby the hidden demand for the item is estimated using the formula

$$H = \lambda\left(1 + \frac{f(D)}{1 - F(D)}\right) - D$$

where the parameter λ is the forecasted mean demand value, H is the hidden demand, f(·) is the single parameter probability distribution function, and F(·) is the cumulative distribution function of the single parameter probability distribution, and D is the draw of the perishable consumer item leading up to the occurrence of the sellout.

2. (Currently Amended) The method according to claim 1 wherein the single parameter probability distribution is Poisson ~~conditioned on the forecasted mean demand value, with a parameter l assuming the forecasted mean demand value whereby:~~

$$H = \lambda\left(1 + \frac{f(D)}{1 - F(D)}\right) - D$$

~~where the parameter l is the forecasted mean demand value, H is the hidden demand, f(·) is the Poisson probability distribution function, and F(·) is the Poisson cumulative distribution function, and D is the draw of the perishable consumer item leading up to the occurrence of the sellout~~.

3. (Currently Amended) The method according to claim 1 wherein the subset ~~of~~ of sales values excludes the actual sales values at all occurrences of sellouts over the observation period.

4. (Currently Amended) The method according to claim 1 and further comprising:

calculating the value of at least one performance metric on the basis of adjusted sales data compensating for hidden demand at occurrences of sellouts over an evaluation period.

5. (Currently Amended) The method according to claim 4 wherein the step of calculating the ~~total stockout~~ value of at least one performance metric includes calculating the total stockout for the perishable consumer item at the outlet over the evaluation period for evaluating the efficacy of a distribution policy for the perishable consumer item at the outlet over the evaluation period.

6. (Currently Amended) The method according to claim 4 wherein the step of calculating the ~~total stockout~~ value of at least one performance metric includes calculating the value of at least one performance metric relating to the sale of the perishable consumer item at the outlet which could be expected to occur over the evaluation period by virtue of the perishable consumer item being delivered in accordance with a recommended distribution policy as opposed to an actual distribution policy for comparing the efficacy of the recommended distribution policy to the efficacy of the actual distribution policy over the evaluation period.

7. (Currently Amended) The method according to claim 6 wherein the step of calculating the ~~total stockout~~ value of at least one performance metric includes calculating the value of at least one performance metric from the following list of performance metrics: change in sales, change in returns, change in number of sellouts, and change in stockout.

8. (Original) The method according to claim 1 wherein the perishable consumer item is a printed media publication.

9. (Currently Amended) A computer-implemented system for estimating the hidden demand for a perishable consumer item at an outlet at an occurrence of a sellout f~~F~~or use with a demand forecast ~~application capable of traversing a demand forecast~~ tree having at least one node with a time series of actual sales values associated therewith representing the actual sales of a~~the~~ perishable consumer item at ~~an~~ the outlet over an observation period, the observation period containing at least one occurrence of a sellout~~, a computer implemented system for estimating the hidden demand for the perishable consumer item at the outlet at an occurrence of a sellout~~, the system comprising:

a database server for storing time series of actual sales values over an observation period;

a forecast engine server for computing demand forecast information for the demand forecast tree; and

a processor for ~~capable of~~ executing the steps of:

determining a subset of sales values of the time series of actual sales values over the observation period for the perishable consumer item at the outlet, the new subset of sales values excluding the actual sales value(s) at the at least one ~~the~~ occurrence of ~~the~~a sellout, the occurrence of the sellout being determined by comparing a sales value of the time series of sales values against a corresponding draw quantity of a time series of draw quantities;

applying a statistical seasonal causal time series forecasting model of count data on the subset of sales values to determine a forecasted mean demand value for the perishable consumer item at the outlet at the occurrence of the sellout; and

estimating the hidden demand at the occurrence of the sellout using a single parameter probability distribution conditioned on the forecasted mean demand value;

wherein the forecasted mean demand value is calculated from the subset of actual sales values excluding the actual sales value(s) at the at least one occurrence of the sellout; and

wherein the single parameter probability distribution is conditioned on the forecasted mean demand value; and

whereby the hidden demand for the item is estimated using the formula

$$H = \lambda\left(1 + \frac{f(D)}{1 - F(D)}\right) - D$$

where the parameter λ is the forecasted mean demand value, H is the hidden demand, f(·) is the single parameter probability distribution function, and F(·) is the cumulative distribution function of the single parameter probability distribution, and D is the draw of the perishable consumer item leading up to the occurrence of the sellout.

10. (Currently Amended) The system according to claim 9 wherein the single parameter conditional probability distribution is Poisson ~~conditioned on the forecasted mean demand value, with a parameter assuming the forecasted mean demand value whereby:~~

$$H = \lambda\left(1 + \frac{f(D)}{1 - F(D)}\right) - D$$

~~where is the parameter the forecasted mean demand value, H is the hidden demand, f(·) is the Poisson probability distribution function, and F(·) is the Poisson cumulative distribution function, and D is the draw of the perishable consumer item leading up to the occurrence of the sellout.~~

11. (Currently Amended) The system according to claim 9 wherein the subset of sales values excludes the actual sales values at all occurrences of sellouts over the observation period.

12. (Currently Amended) The system according to claim 9 and further comprising ~~capable of~~ executing a step ~~(d)~~ of:

calculating the value of at least one performance metric on the basis of adjusted sales data compensating for hidden demand at occurrences of sellouts over an evaluation period.

13. (Currently Amended) The system according to claim 12 wherein the step ~~(d)~~ of calculating the ~~total stockout~~ value of at least one performance metric includes calculating the total stockout for the perishable consumer item at the outlet over the evaluation period for evaluating the efficacy of a distribution policy for the perishable consumer item at the outlet over the evaluation period.

14. (Currently Amended) The system according to claim 12 wherein the step ~~(d)~~ of calculating the ~~total stockout~~ value of at least one performance metric includes calculating the value of at least one performance metric relating to the sale of the perishable consumer item at the outlet which could be expected to occur over the evaluation period by virtue of the perishable consumer item being delivered to the outlet in accordance with a recommended distribution policy as opposed to an actual distribution policy for comparing the efficacy of the recommended distribution policy to the efficacy of the actual distribution policy over the evaluation period.

15. (Currently Amended) The system according to claim 13 wherein the step ~~(d)~~ of calculating the ~~total stockout~~ value of at least one performance metric includes calculating the value of at least one performance metric from the following list of performance metrics: change in sales, change in returns, change in number of sellouts, and change in stockout.

16. (Original) The system according to claim 9 wherein the perishable consumer item is a printed media publication.

Reasons for Allowance

4. **Claims 1-16 are allowed.**

5. **The following is an examiner's statement of reasons for allowance:**

None of the prior art of record, alone or in combination, teach or suggest estimating the hidden demand for a perishable consumer item at an outlet over an observation period containing at least one sellout, *wherein the forecasted mean demand value used to estimate hidden demand excludes one or more actual sales value(s) at the occurrence of the sellout(s), and wherein a single parameter probability distribution conditioned on the forecasted mean demand value is used to estimate the hidden demand at the occurrence of sellout(s)* as recited in independent claims 1 and 9.

The closest prior art *Bell* (1978, 1981, and 2000) discloses a method of forecasting expected demand for a periodical from historical sales data taking into account occurrences of sellouts (1978 and 1981) improving on the old and well known "newsboy" optimization problem by optimizing expected demand estimation for an issue of a periodical distributed to multiple retailers, and later (2000) improving on the forecasting in the presence of large numbers of stockouts. Similarly, *Artto* (1999) discloses a method of forecasting expected demand for a periodical from historical sales data taking into account occurrences of stockouts and extending Bell by adding seasonality and causality. On close examination of the methods of Bell and Artto as compared to the present invention, Bell and Artto estimate hidden demand using the assumption of a normal probability distribution (a two parameter distribution) in the calculation of total expected demand at the occurrence of the sellout by adjusting the

sales value at the sellout using a formula based on the normal distribution parameters (mean and variance) employed in the calculation of the *initial draw* of the perishable good at the outlet. However, Bell and Artto use a mean value forecasted from a prior period of sales, i.e. Bell and Artto assume *stationary* demand from a prior period in which sales data were used to estimate a normal probability distribution for use in determining the initial draw at the outlet.

In contrast, the present invention estimates hidden demand using a single-parameter probability distribution conditioned on a forecasted mean demand value calculated from actual sales during the observation period in which the sellout(s) have occurred excluding the actual sales values at the occurrence of the sellout(s) and estimating the hidden demand from a formula based on the single-parameter probability distribution, the draw at the occurrence of the sellout, and the forecasted mean demand. In so doing, the present invention improves on Bell and Artto by providing a more accurate estimate of hidden demand by accounting for the *non-stationary* nature of demand for perishable goods at an outlet and by preventing the known artifact of calculating negative demand values (an error) potentially resulting from use of the normal probability distribution in the manner of Bell and Artto.

Similar to Bell and Artto, Agrawal (1996) teaches estimating demand in the presence of stockouts using normal, Poission, and negative binomial distributions, including teaching that normal distributions could potentially assign negative values in the case of low demand data. However, Agrawal teaches calculating the mean of observed demand using truncated data (the sales data at the occurrence of the sellout

"truncated" as a consequence of potentially more demand than stock) as compared to the present invention which calculates a forecasted mean demand value excluding truncated sales at the sellout(s), and instead calculating the hidden demand using a formula based on the single-parameter probability distribution, the draw at the occurrence of the sellout, and the calculated forecasted mean demand as recited in claims 1 and 9.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dave Robertson whose telephone number is (571) 272-8220. The examiner can normally be reached on 8:45am to 4:15pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq R. Hafiz can be reached on (571) 272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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